

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application. No new matter has been introduced by way of the claim amendments. Current additions to the claims are noted with underlined text. Current deletions from the claims are indicated by ~~strikethrough~~ text or [[double bracketing]]. The status of each claim is indicated in parenthetical expression following the claim number.

1. (Currently Amended) A method comprising:

dispersing carbon nanotubes in an acid solvent to form a solution of dispersed carbon nanotubes having substantially exposed sidewalls;

wherein the acid solvent is selected from the group consisting of a superacid and an oxoacid further comprising a persulfate species; and

adding a functionalizing agent to the solution; and

functionalizing the dispersed carbon nanotubes using [a] the added functionalizing agent while the dispersed carbon nanotubes are in the acid solvent;

wherein the functionalizing comprises covalently attaching the added functionalizing agent functional groups to the substantially exposed sidewalls to form sidewall functionalized carbon nanotubes.
2. (Original) The method of Claim 1, wherein the carbon nanotubes are selected from the group consisting of single-wall carbon nanotubes, double-wall carbon nanotubes, multi-wall carbon nanotubes, small diameter carbon nanotubes, and combinations thereof.
3. (Previously Presented) The method of Claim 1, wherein the superacid is selected from the group consisting of oleum, chlorosulfonic acid, triflic acid, and combinations thereof.
4. (Previously Presented) The method of Claim 1, wherein the oxoacid is selected from the group consisting of H_2SO_4 , H_3PO_4 , $HClO_4$, HNO_3 , and combinations thereof.
5. (Previously Presented) The method of Claim 1, wherein the acid solvent comprises H_2SO_4 .
6. (Cancelled).

7. (Previously Presented) The method of Claim 1, wherein the functionalizing agent is selected from the group consisting of carbocations, halonium ions, metal cations, carbon radicals, halogen radicals, hetero-atom radical species, metal-based radicals, dipolarophiles, and combinations thereof.
8. (Previously Presented) The method of Claim 1, wherein the functionalizing agent comprises a diazonium species.
9. (Previously Presented) The method of Claim 8, wherein the diazonium species is generated *in situ* by reacting an aniline species with a nitrite species.
10. (Previously Presented) The method of Claim 8, wherein the diazonium species comprises a diazonium salt.
11. (Original) The method of Claim 8, wherein the diazonium species is generated from a triazene precursor.
12. (Previously Presented) The method of Claim 1, further comprising:
processing the sidewall functionalized carbon nanotubes by at least one post-processing step selected from the group consisting of diluting, filtering, washing, drying, and combinations thereof.
13. (Previously Presented) The method of Claim 1, further comprising:
isolating the sidewall functionalized carbon nanotubes from the acid solvent by filtering to yield isolated sidewall functionalized carbon nanotubes; and
resuspending the isolated sidewall functionalized carbon nanotubes in a solvent.
14. (Original) The method of Claim 13, wherein the solvent is water.
15. (Previously Presented) The method of Claim 1, wherein the functionalized carbon nanotubes have at least about 1 functional group per every 100 carbon nanotube carbons.
16. (Currently Amended) A method comprising:
dispersing single-wall carbon nanotubes in a superacid solvent to form a dispersion of single-wall carbon nanotubes;

adding an aniline species and a nitrite species to the dispersion to form a [a] diazonium species in the superacid solvent; and

reacting the single-wall carbon nanotubes with the diazonium species while dispersed in the superacid solvent to form functionalized single-wall carbon nanotubes.

17. (Previously Presented) The method of Claim 16, further comprising:
oxidatively purifying the single-wall carbon nanotubes prior to dispersing.

18. (Previously Presented) The method of Claim 16, wherein the single-wall carbon nanotubes are sorted by a property selected from the group consisting of length, diameter, chirality, and combinations thereof prior to dispersing.

19. (Previously Presented) The method of Claim 16, further comprising:
filtering the dispersion to remove any large particles.

20. (Previously Presented) The method of Claim 16, wherein the superacid solvent is selected from the group consisting of oleum, chlorosulfonic acid, triflic acid, and combinations thereof.

21. (Previously Presented) The method of Claim 16, wherein the aniline species comprises sulfanilic acid.

22. (Previously Presented) The method of Claim 16, wherein the superacid solvent further comprises a radical source.

23. (Original) The method of Claim 22, wherein the radical source is selected from the group consisting of 2,2'-azo-bis-isobutyrylnitrile, benzoyl peroxide, di-tert-butylperoxide, and combinations thereof.

24. (Previously Presented) The method of Claim 16, wherein reacting comprises heating and stirring the dispersion.

25. (Previously Presented) The method of Claim 16, further comprising:
after reacting, diluting the dispersion with water to form a diluted dispersion;

filtering the diluted dispersion to isolate the functionalized single-wall carbon nanotubes; and

washing the functionalized single-wall carbon nanotubes with a washing solvent after filtering.

26. (Original) The method of Claim 25, wherein the washing solvent is acetone.

27. (Currently Amended) The method of Claim 25, further comprising:
after washing, re-suspending the functionalized single-wall carbon nanotubes in water to form a suspension; and
filtering the suspension to recover the functionalized single-wall carbon nanotubes.

28. (Previously Presented) The method of Claim 16, wherein the functionalized single-wall carbon nanotubes have at least about 1 functional group per every 100 carbon nanotube carbons.

29. (Previously Presented) The method of Claim 8, wherein the acid solvent further comprises a radical source.

30. (Previously Presented) The method of Claim 1, wherein the sidewall functionalized carbon nanotubes are water soluble.

31. (Previously Presented) The method of Claim 16, wherein the functionalized single-wall carbon nanotubes are water soluble.

32. (Previously Presented) The method of Claim 16, wherein the functionalized single-wall carbon nanotubes are functionalized on their sidewalls.